While Prof. Mudge and I were at Humboldt, a gentleman told us there was a trap dike in Linn county. I undertook to visit it as early as possible. Only a short time before his death, Prof. Mudge wrote, asking me had I been to Linn county. I had not then, but in December last I made the visit. There was no trap dike.

In conclusion, we would again call to mind the statement in the biennial report, that there is no metamorphic rock in Kansas, and ask your attention to the fact that the statement was scarcely published ere the author learned that there was, and followed up the discovery with zest.

Again, the rock specimens were in the hands of experts, who examined them in reference to the question of metal or no metal, but overlooked for a time the question, What led people to think there was metal there? Prof. Patrick, who has also visited Silver City, in Woodson county, pronounces that half-mile of land the most remarkable mineral district he has ever visited; and I, thinking the same, do not wonder that some uneducated men, seeing indications very like what we see in Colorado, should have become infatuated with the idea of finding the precious metals. They see resemblances—a lack of geological knowledge hinders them detecting differences.

Why do I mention these things? To suggest that if our State was thoroughly surveyed geologically, local reports could be investigated by a competent official before time and money were wasted in useless enterprises, and very probably knowledge would be obtained that could direct capital into useful and remunerative undertakings.

Further, we would suggest to local geologists to look out for signs of metamorphism and trap dikes. In other parts of the world to-day, and also in the geological ages, there have been igneous overflowings without extensive fracture, and this was not unknown in the Cretaceous period. These would cause local metamorphism and peculiar mineral conditions. Let the geologists of Labette, Cowley and other counties, besides looking for fossils and the line of outcrop, look also for crystaline structure and local faults, till we know more fully than we know now the Igneous Rocks of Kansas.

ARE THERE IGNEOUS ROCKS IN CHEROKEE COUNTY?

BY ERASMUS HAWORTH, EMPIRE CITY, KANSAS.

In the March number of the *Kansas City Review of Science and Industry*, the writer published an article entitled, "The Chert Rocks of Sub-carboniferous Kansas." In this article two points are particularly insisted upon: First, that the chert rocks have been deposited in layers, are true stratified rocks, and are not metamorphosed limestone; second, that there is not only no indication of volcanic action among those rocks, but that there is positive evidence to the contrary. It is also held that the reason given by Dr. Schmidt,

of St. Louis, for the numerous fractures in those rocks, is entirely inadequate. To avoid an unnecessary repetition, it has been thought best simply to exhibit characteristic specimens at present, and give to those interested the above reference for a fuller discussion of the subject.

Specimen No. 1 is a fragment of chert with fossil corals on one side. It has evidently been adjoining a limestone, as a number of the prominences on the fossiliferous side are limestone.

No. 2 is a specimen of what is locally called "cotton" rock. It exists very abundantly along the northwest limit of the Sub-carboniferous, particularly in Jasper county, Mo. It shows a mass of fragmental crinoid stems, one of which is fully six inches long; also a few other fossils common in this formation, among which is a trilobite.

No. 3 is a cherty rock with crinoids and other fossils.

No. 4 is a sample of what has been called volcanic tufa.

No. 5 is a specimen of the same, but in this small specimen, which weighs less than half a pound, there are more than fifty fossils.

No. 6 is a similar specimen.

No. 7 is a sample of decomposing chert, the center of which is still unchanged.

Nos. 8 and 9 are samples of rocks containing cavities from which crystals of sphalerite (*zinc blende*) have been removed.

Nos. 10, 11 and 12 are similar specimens, which still retain a portion of their crystals, although they have been strongly acted upon apparently by a solvent. These show conclusively that the crystals were formed prior to the formation of the rock around them; otherwise the crystals would have assumed the shape of the cavities in the rocks, which would not have corresponded exactly to the crystalline form of sphalerite.

No. 13 is a collection of sphalerite crystals, which also show the effect of some solvent. This specimen has not been above ground more than ten days.

Nos. 14 and 15 are specimens of galena crystals, partly removed by a solvent. The same may be said, with reference to the time of their formation, that was said when speaking of the sphalerite crystals. If we will now consider the great range of temperature between the fusing points of those two minerals and that of the surrounding rock, and also consider the invariable result of fusing lead and zinc ores with silica—that is, the formation of silicates—we will see at once that these, as well as the fossils, are positive evidence against the igneous origin of these rocks.

No. 16 is a fossiliferous chert rock, upon which calamine (*zinc silicate*) has been deposited, showing that the presence of this mineral is no evidence in favor of the igneous theory.

No. 17 is similar, only it shows that while the silicate was being deposited, the chert was being dissolved. This act is carried so far that the form of the chert rock is almost destroyed, but two fragmental fossils are still preserved.

Nos. 18 to 22 inclusive give some idea of the manner in which the chert is fractured.

Nos 23 and 24 illustrate that which is often seen on a grand scale —alternating layers of chert and limestone. In specimen No. 3 there is strong indication of limestone having been silicified. The specimen shows three layers—an interior one, and two exterior ones. The interior one contains by far the greater number of fossils, and may thus have been more porous than the exterior ones. It would therefore have yielded more readily to silicifying waters, and it is possible that the whole of the specimen was at one time a limestone. The exterior portion is at present quite calcareous, even containing some carbonate. The theory advanced for the formation of great beds of chert, requires conditions quite favorable for such metamorphisms. They are not only possible, but altogether probable. But can anyone hold specimen No. 24 in his hand and say he thinks the chert in it was at one time limestone? Let me repeat: It only represents on a small scale that which exists on a large scale—alternating layers of chert and limestone. Specimens 21 and 22 are good arrow-head flint, but 22 has many crinoid stems in it.

No. 25 is a concretionary formation containing fossils. If this was formed in some cavity, how could those shells have been suspended in that cavity so that they would have been included in the central portion of the concretion? If those shells were originally included in limestone, why would such a peculiarly-shaped portion of that limestone have been silicified? If the limestone originally assumed this shape, why is it that similarly-shaped limestones are not found in localities where they have not been silicified? If they were fragments of limestone, water-worn until they became of this shape, why are the concentric layers so plainly marked? And why do some of them have small cavities along their major-axis? And why do some of them have two distinct centers around which the material has been collected, thus forming a true twin concretion?

FOSSIL WOOD.

BY ROBERT HAY, JUNCTION CITY, KANSAS.

Everybody in Kansas who has any collection of minerals or fossils, or merely a handful of so-called curiosities, is sure to have a piece of fossil wood. Inquiry develops the fact that the pieces were picked up on the high prairie, in a dry ravine, in a creek bed, on a river bottom, or in almost any conceivable situation. Some of these pieces are found *in situ*. They have been petrified at or near the spot where they were found by agencies now or very recently in operation. Elk creek, in Jackson county, yields petrifactions in the form of iron pyrites; while a small tributary of McDowell's